

PCT/EP2005/002993

SWIMMING AID DEVICE

The invention relates to swimming aid devices or swimming aids which can be adapted flexibly to body size by providing a multiplicity of ready-to-wear sizes. The swimming aid device or swimming aid according to the invention may be designed in a lightweight, highly elastic form and may be adjusted to fit the desired body size of the user exactly.

For applying to the body swimming aids consisting of foil with air chambers are largely used. Mention should also be made in this connection to the widely used "swimming wings" which are worn on the upper arm. In such a design, lifting capacity in the water is provided but unimpeded movement is considerably limited. Swimming aid devices of prior art, which are put on with straps, only have buoyancy elements on the back, as disclosed in DE 200 05 183 U1, thereby limiting safety and functionality. A swimming aid with buoyancy elements around the chest region and arms is described in DE 3239929 C2.

Furthermore, bathing suits, combined with plug-in styropore or enclosed air chambers, are known - see also US 5413485A, but these only fit according to the size of the bathing suit and are mainly worn by girls only.

For the purpose of acting as a sailing/surfing jacket, with distribution of the loading of forces, US 4545773A describes a device in which a hook provides a releasable connection to a part of the sail/surf board and in which belts or straps which are connected to the hook on the one hand and to hip and shoulder parts of the sailing/surfing jacket on the other allow distribution of the loading of forces.

The object of the invention is to guarantee the user or wearer of the swimming aid device sufficient buoyancy and safety in the water, with a substantial freedom of movement, comfortable closing characteristics and flexibility. This object is achieved according to the invention with the swimming aid device defined in Claim 1. Preferred embodiments are described in the dependent claims.

According to the invention the swimming aid device can be adapted exactly to the respective body.

The invention provides certain uni-sizes, which means that due to the substantial variability of the adjusting possibilities of the swimming aid device sizes 92 to 122 in children, for example, and sizes 48 to 62 in adults, for example (German size standard in each case, sizes according to M to XL in adults) can, according to design, be covered in a single size of the swimming aid device. In children this swimming aid therefore "grows" with them in practice.

The swimming aid device according to the invention has significant advantages over the state of the art, advantages which are not seen in conventional swimming aid devices. For instance, the swimming aid device according to the invention allows variable adjustability of the size but at the same time guarantees safety for the user during use and improves functionality. The first, releasable closure means is used to preset the variable size. The embodiment according to the invention advantageously prevents the loss of buoyancy and/or ability of the swimming aid device to be worn on the body of the user by the opening and releasing of the second closure means. Independently of the first closure means, i.e. without having to release it, the second closure means can be released and separated - if necessary completely - by the user when wearing the aid. For example, the second, releasable closure means can be

used, for example, for additional opening of the size variable part, which is explained in more detail hereafter in the example of the second preferred embodiment in the form of a jacket, or for fitting the buoyancy element and preferably an additional buoyancy element, which is explained hereafter in the example of the first preferred embodiment in the form of a support strap system, but where, in the embodying cases the full release or separation of the second closure means available to the user him/herself may be effected without altering the preset body size adjustment. This increases safety and functionality substantially.

The features of the dependent claims offer further significant advantages: the features of Claims 2 and 3 each provide improved designs with simple, reliable, variable presetting of the body size adjustment, whilst at the same time enabling the swimming aid device to be put and taken off conveniently and quickly. Here the swimming aid device can be adapted flexibly, through many ready-to-wear sizes, to the exact body size of the user. The features of Claim 4 provide additional safety. The features of Claim 5 improve the fitting accuracy of the swimming aid device generally, whilst still allowing the device to be conveniently and quickly put on and taken off. The features of Claim 6 relate to an alternative design which provides a particularly light and highly elastic swimming aid device which can again be adapted exactly and very flexibly to the body size through many ready-to-wear sizes, whilst at the same time further improving safety during wearing. The features of Claim 7 further improve functionality, simply and efficiently. Safety, particularly for children and handicapped persons, is additionally improved with the features of Claims 8 and 11. Accidental opening of the swimming aid device is prevented by means of a buoyancy element fitted at the point of closure of the support strap. The features of Claim 9 provide an ideal swimming

aid device with high wearing comfort. With a suitably designed first closure element an extremely advantageous, simultaneous combination of size variability on the one hand and reliable wearing on the other hand is achieved with the features of Claim 10. The arrangements described in Claim 12 improve and extend functionality. The same applies to the features of Claims 13 and 14.

The swimming aid device according to the invention may be used for children and adults alike.

For children this swimming aid is ideal for learning to swim. Design variants, with the possibility of buoyancy adjustment, are also useful. For instance, the total buoyancy setting is used initially for creating a feeling of safety, for acclimatising to the water and for practising swimming movements. As the child progresses in the swimming lessons, the buoyancy can be reduced by reducing the volume and/or the material of the buoyancy element (elements) of the swimming aid device, whereupon the child can progress to free swimming.

This invention can generally be worn for the safety of children during activities on and in the water.

Adults may also wear this swimming aid device for safety in the water and in connection with various sporting and leisure activities. Ideal applications include, for example, swimming courses, aqua jogging and water gymnastics, and also surfing, waterskiing, rafting, paragliding and water excursions by boat or on fun rides, for example.

Moreover, people can be located faster with suitable colouring, and if the swimming aid device is designed in the form of a jacket, the body is better protected from UV radiation, injuries and loss of body heat.

Other important fields of application are rehabilitation and handicapped assistance and support. A very high degree of wearing comfort is guaranteed with this swimming aid device, and natural movements are not impeded, so that suitable therapies are well supported by the device.

The invention is described in further detail hereafter by means of exemplary embodiments.

Non-restrictive examples of the use and design of swimming aid devices according to the invention are shown in the drawings, in which

- Figure 1 and Figure 2 show a swimming aid device with support strap and buoyancy elements according to a first embodiment of the invention for children, Fig. 1 showing the view from the front and Fig. 2 the view from behind. In this representation chest and back cushions of a textile material are sewn and filled with closed cell foam panels;
- Fig. 3 and Fig. 4 show a swimming aid device with support strap for children, Fig. 3 showing the front view and Fig. 4 the rear view. In this representation the chest and back sections are cut from a closed cell foam material and are connected directly to the chest strap.
- Fig. 5 shows a particular design of the swimming aid device according to the principle of the first embodiment of the invention in horizontal cross-section, where, in addition to the first closing means for variable body size adjustment, an additional closing means is provided on the first closing means, including a buoyancy element;

- Fig. 6a to 6f show components of the swimming aid device, with support strap, according to the first embodiment of the invention, Fig. 6a showing the outside view of the support strap and Fig. 6b showing the view of the body side of the support strap. Figs. 6c and 6d show the chest cushion, Fig. 6c showing the outside view (the side facing away from the body) and Fig. 6d showing the inside view (the side facing toward the body). Figs. 6e and 6f show the back cushion, Fig. 6e showing the outside view and Fig. 6f the view of the body side. In this representation all the parts are sewn from textile material and are filled with buoyant material;
- Figures 7a and 7b show a jacket-type swimming aid device according to the invention in a design for children, Fig. 7a showing the view from the front and Fig. 7b showing the view from the rear. In this representation the swimming aid device is sewn from textile material and is filled with closed cell foam panels. In this embodiment all the straps shall be closed at the rear for safety reasons and the zip handle is protected with a cover;
- Figs. 8a and 8b show a jacket-type swimming aid device according to the invention in a design for adults, Fig. 8a showing the front view and Fig. 8b showing the rear view. In this representation the swimming aid device is sewn from textile material and is filled with closed cell foam panels.
- Figs. 9a to 9c show a swimming aid device according to the invention according to the principle of the second embodiment as a jacket-type design in its component parts, Fig. 9a showing the view of the back section and Figs. 9b and 9c the view of second front sections.

All the parts are sewn from a textile material and are filled with buoyant material.

Description of preferred embodiments:

First preferred embodiment

Panels of closed cell foam material of varying thickness, elasticity and weight may be used to manufacture the swimming aid device according to the invention. All suitable buoyant materials may be used, including buoyant granulates, flocks and beads, e.g. of polystyrene and cork. Furthermore, chambers of water- and airtight material can guarantee buoyancy when filled with air. Shapes, e.g. animals, heads and figures can also be cut from panel material 6 and 7 (Figs. 3 to 5), which may be designed in different colours, e.g. dyed, printed, coated and glued. Buoyant materials which are surrounded by textile material may be provided with motifs and advertising by printing, sewing, embroidery, stickers and iron-on transfers.

Figurative and semi-plastic objects, which may also be designed in different colours, may be used as buoyant elements by mould foaming.

In a preferred embodiment of the invention a closed cell polyethylene foam (e.g. 10 mm thick), sewn in textile material, may be used as support strap 1 (Figs. 1-5, 6a and 6b). Infinitely variable adjustment on the body is possible by means of Velcro tape 20 and 21 (Figs. 6a and 6b). The attachments are sewn from textile material and filled with closed cell foam material, e.g. polyethylene or polyurethane foam. The filling may consist of a plurality of panels until the desired buoyancy is obtained. The panels are loosely inserted, which provides greater elasticity. Back cushions 3 (Figs. 2, 6e and 6f) are pulled up to support strap 1 with tape loops 5, and front cushions

2 (Figs. 1, 6c and 6d) are secured by means of Velcro tape 23, 24, (Figs. 6c and 6d). The size of the cushions is dimensioned so that they provide sufficient buoyancy.

In the swimming aid device with support strap and buoyant elements for children, shown in Figs. 1 and 2 generally and in Figs. 6a-6f in its component parts, chest and back cushions are sewn from textile material and are filled with closed cell foam panels. Velcro tapes, as the first closing means, are fitted at different points on the support strap ends for closing the support strap. Thus a Velcro tape 20 is only fitted on the outside of the first end of the support strap, which tape, when closed, hooks into Velcro tape 21 of the second end of the support strap fitted on the inside. A Velcro tape is additionally fitted on the second end on the outside 22, and on the chest cushion on the inside 23, as the second closure means for fastening chest cushion 2 to the closing point on the support strap. Chest cushion 2 is fixed once more (23 and 24 in Figs. 6c and 6d) by means of 2 Velcro tapes (4 in Fig. 1, 19 in Fig. 6a), each of which is fitted in a region in front of the support strap ends.

In the embodiment shown in Figs. 3 and 4 the connection is made, in addition to the size variable presetting of support strap 1 with the first closure means, by means of the second closure means, which is designed in the form of recesses in buoyancy element 6, 7 and Velcro tape 8 pulled through on front buoyancy element 6 and loops 9 on rear buoyancy element 7. Fig. 5 shows a further embodiment in horizontal cross-section, wherein a Velcro tape 4 is provided as a second closure means, not as in Fig. 3 in the form of a recess in the front buoyancy element, but in the forward direction along the lateral face of front buoyancy element 6. With the designs in Fig. 3 and Fig. 5 examples are shown in which the first closure on support strap 1 is closed once again by the second closure and is therefore

further secured. Body 6 serving as the buoyancy element therefore sits securely on the variable closure.

The material for the support strap is widely variable. The strap may, for example, may be formed, as described, from foam material sewn into textile material, but may also be formed from fabric materials, elastic tape or commercially available straps. The width and thickness may also be selected according to requirements. A suitable width is 1 to 15 cm, for example, preferably 2 to 7.5 cm and in particular 3 to 5 cm. A suitable thickness is for example 0.5 mm to 2 cm, preferably 2 mm to 1 cm.

Second preferred embodiment:

In a further particularly preferred embodiment of the invention the swimming aid device is made in the form of a jacket from textile material. The textile material is connected to a thin buoyant material (e.g. approx. 3 - 5 mm), e.g. by sewing or gluing, which positively influences the optics in particular. The component parts are then sewn together, filled with buoyant material (e.g. closed cell polyethylene or polyurethane foam panels, e.g. approx. 10 mm thick), and closed. The buoyant material filling may consist of a plurality of panels until the desired buoyancy is obtained. The panels are loosely inserted, which increases elasticity. Material properties of the panels, such as volume, type of material and porosity, are dimensioned so that sufficient buoyancy is provided. In the chest region and in the upper back region the filling is designed to be thicker, which corresponds more closely to the body weight proportions and the desired behaviour in water. Infinitely variable adjustment on the body is made possible by means of Velcro tape on the sides and in the shoulder region. The lateral adjustments are made by means of widely overlapping straps 10 (Figs. 7b and 8a), onto which Velcro tape or Velcro surfaces 15, 17 (Fig. 9a-9c)

are sewn. The adjustment facility in the shoulder region, by means of additional strap 11 and Velcro closures 16, 18 (Figs. 7b, 9a-9c) is used to adapt to the upper arm and shoulder in question, so that the arm section always fits exactly. This adjustment facility also serves to prevent the effect of the swimming aid device sliding up on the body due to buoyancy in the water. Because of the precisely fitting closure of the shoulder straps, the lateral straps always lie immediately underneath the shoulders, thereby preventing the device from sliding up in the water. An additional closure, e.g. a zip or another reclosable closing means, such as a clicking closure, enables the device to be put on and taken off conveniently and quickly. Thus a user of the device is able to omit adjusting the Velcro closures and wear the swimming aid device as a jacket; in that case he/she need only open and close the closure means (the second one in this embodiment), e.g. the actuate zip 14 (Figs. 7a, 9b).

Once the jacket-type embodiment of the swimming aid device according to the invention has been adjusted for a particular person, it will in future require no further adjustments. The swimming aid is then put on and taken off simply as a jacket. Putting on and taking off the swimming aid, and adjusting it to the particular body size, are operations that can be carried out quickly and safely.

The end product should be tolerable to the skin and harmless to health.

Examples:

Example 1:

Construction of a swimming aid device with support strap for children, according to the invention, with a buoyancy volume of approx. 4 litres, e.g.:

- Support strap 1 (Figs. 1-4; 6a and 6b): 110 mm wide, 10 mm thick closed-cell polyethylene foam (30 kg/m^3 , e.g. Cellu-Cushion from the company SEALED AIR) sewn into material (e.g. polyester material 5407-7200 from UCO), with Velcro tape (50 mm wide, e.g. polyester Velcro tape from APLIX) provided for the connection.
- Chest cushion 2 (Figs. 1; 6c and 6d): 4 x 10 mm thick PE foam in reclosable material sleeve with sewn on Velcro tape for fastening to the support strap (materials as support strap), the chest cushion can be secured on the side with Velcro tape 4 (Fig. 1) or 19 (Fig. 6a). The closure of the support strap, which is used for size variable adjustment, is then additionally protected against accidental opening.
- Back cushion 3 (Figs. 2; 6e and 6f): 4 x 10 mm thick PE foam, materials as chest cushion, but instead of a Velcro tape connection provided with sewn on tape loops 5 (Figs. 2; 6f) for pulling up onto the support strap.

Example 2:

Construction of a jacket-type swimming aid device for children, according to the invention, with a buoyancy volume of approx. 4 litres and a total weight of approx. 230 g, e.g.:

- The swimming aid device is sewn from textile material (e.g. polyester material 5407-7200 from UCO). The textile material is sewn on complete with a thin closed cell foam (e.g. 3 mm thick, e.g. TEE 3003-00 from ALVEO). A closed cell polyethylene foam (e.g. 30 kg/m^3 , 10 mm thick, e.g. Cellu-Cushion from the company SEALED AIR) is used as the buoyant material. A little more polyethylene foam is inserted in the chest

and upper back regions and is fixed with darts 12 to protect against sliding (see Figs. 7-9). Straps 10, with sewn on Velcro tape 17 (e.g. 50 mm wide, e.g. polyester Velcro tape from APLIX)), which rests against Velcro tape 15 for releasable closure, is provided as a first closure means for size variable adjustment, and a zip 14 (e.g. 270 mm, e.g. P60 from Coast) is used for putting on the jacket (e.g. putting on and taking off the jacket quickly (Figs. 7-9). In the case of young children, the closure straps can be closed towards the back, for safety reasons (see Fig. 7b) and the zip handle protected with a cover 25 (Fig. 7a).

To achieve variability of the buoyancy volume, cushions with buoyant material or foam panels, for example, are fastened to the front and/or back sections of the swimming aid device, and the swimming aid device is manufactured with reclosable pockets (e.g. with Velcro tape, zip or other reclosable closure techniques), so that buoyancy material can easily be removed and refilled if necessary. The additional buoyancy elements may, if necessary, be fitted or removed again.

Further features of the swimming aid device according to the invention are that an extremely high degree of wearing comfort is guaranteed by the exact fitting adjustment facilities and the use of extremely light, elastic materials. The swimming aid device is put on and taken off, and adjusted to the body size in question, quickly and safely.

An advantage of the swimming aid device of variable size according to the invention also lies in the fact that all ready-to-wear sizes can be covered with only a small number of models. Because of the small number of parts and materials required the production costs are minimised and

customers, dealers, hirers, trainers and therapists incur lower acquisition and stocking costs because of the smaller number of different sizes required.

List of reference numbers

- 1 Support strap
- 2 Chest cushion
- 3 Back cushion
- 4 Additional protection for the buoyancy element on the support strap
- 5 Tape loops for pulling onto the support strap
- 6 Buoyancy element front
- 7 Buoyancy element back
- 8 Fastening for buoyancy element, with support strap, front side
- 9 Fastening for buoyancy element, back
- 10 Lateral strap for adapting to body size
- 11 Shoulder strap for adapting the arm section
- 12 Stitching
- 13 Hanger
- 14 Zip
- 15 Lateral strap with hooked Velcro tape
- 16 Shoulder strap with hooked Velcro tape
- 17 Lateral strap with flanged Velcro tape
- 18 Shoulder strap with flanged Velcro tape
- 19 Velcro tape for securing buoyancy element
- 20 Support strap closure with hooked Velcro tape
- 21 Support strap closure with flanged Velcro tape
- 22 Velcro tape for fastening the buoyancy element
- 23 Velcro tape for fastening with the support strap
- 24 Velcro tape for additional securing of the buoyancy element
- 25 Zip fastening